IN THE CLAIMS

Please cancel claims 12 and 13.

1. (Previously Amended) An apparatus for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

a conditioning body having a conditioning surface configured to engage a planarizing surface of the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium to condition the planarizing surface;

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body;

a sensor coupled to the conditioning body to detect a frictional force in a plane of the planarizing surface, the frictional force being imparted to the conditioning body by the planarizing medium when the one of the conditioning body and the planarizing medium is moved relative to the other of the conditioning body and the planarizing medium; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the frictional force.

2. (Original) The apparatus of claim 1 wherein the planarizing medium includes a polishing pad.

3. (Original) The apparatus of claim 1 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

4. (Original) The apparatus of claim 1 wherein the conditioning body includes abrasive elements for abrading the planarizing surface of the planarizing medium.

5. (Canceled)

6. (Canceled)

7. The apparatus of claim 1 wherein the sensor includes a force sensor.

8. (Canceled)

9. (Canceled)

10. (Original) The apparatus of claim 1, further comprising an actuator coupled to the conditioning body for controlling at least one of a position of the conditioning body and an approximately normal force between the conditioning body and the planarizing medium, the actuator being coupled to the sensor to receive signals from the sensor and adjust the one of the position and the approximately normal force in response to the signal.

11. (Canceled)

12. (Canceled)

13. (Canceled)

14. (Original) The apparatus of claim 1, further comprising:

a piston; and

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the frictional force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and the closed end of the cylinder, the sensor including a gauge positioned to measure movement of the one of the piston and the cylinder relative to the other of the piston and the cylinder.

15. (Original) The apparatus of claim 14 wherein the piston is sealably engaged with the cylinder.

16. (Original) The apparatus of claim 14, further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

17. (Original) The apparatus of claim 14 wherein the gauge includes a pointer on one of the piston and the cylinder and a scale on the other of the piston and the cylinder, the pointer being aligned with the scale and movable relative to the scale to indicate relative movement between the piston and the cylinder.

18. (Canceled)

19. (Canceled)

20. (Canceled)

21. (Canceled)

22. (Previously Amended) An apparatus for measuring forces during conditioning of a chemical-mechanical planarizing surface, comprising:

a planarizing medium having a planarizing surface for removing material from a microelectronic substrate, the planarizing surface defining a planarizing surface plane;

a conditioning body adjacent to the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium for conditioning the planarizing surface, the conditioning body and the planarizing medium generating a force in the planarizing surface plane when the one of the conditioning body and the planarizing medium moves relative to the other of the conditioning body and the planarizing medium;

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body;

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between

the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the drag force; and

a sensor operatively coupled to the conditioning body to detect the force.

23. (Original) The apparatus of claim 22 wherein the planarizing medium includes a polishing pad.

24. (Original) The apparatus of claim 22 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

25. (Original) The apparatus of claim 22 wherein the conditioning body is rotatable relative to the planarizing medium.

26. (Original) The apparatus of claim 22 wherein the conditioning body is translatable relative to the planarizing medium.

27. (Original) The apparatus of claim 22 wherein the planarizing medium is rotatable relative to the conditioning body.

28. (Canceled)

29. (Original) The apparatus of claim 22 wherein the sensor includes a force sensor.

30. (Canceled)

31. (Original) The apparatus of claim 22, further comprising:

a piston; and

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and

the closed end of the cylinder, the force sensor including a gauge positioned to measure movement of the piston relative to the cylinder.

32. (Original) The apparatus of claim 31 wherein the piston is sealably engaged with the cylinder.

33. (Original) The apparatus of claim 31, further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

34. (Original) The apparatus of claim 22, further comprising a feedback device coupled to the sensor and the conditioning body for changing at least one of the force between the conditioning body and the polishing pad and a position of the conditioning body relative to the polishing pad in response to a signal from the sensor.

35. (Previously Amended) An apparatus for monitoring conditioning of a planarizing medium used for chemical-mechanical planarization of a microelectronic substrate, comprising:

a conditioning body having a conditioning surface configured to engage a planarizing surface of the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium to condition the planarizing surface, the conditioning body generating a drag force generally parallel to the planarizing surface;

a piston;

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and the closed end of the cylinder, the sensor being positioned to detect relative motion between the piston and the cylinder;

an actuator coupled to the conditioning body with a support assembly to control at least one of a generally normal force between the conditioning body and the planarizing medium and a position of the conditioning body relative to the planarizing medium;

a sensor coupled to the support assembly to detect the drag force; and

a feedback device coupled to the actuator to control activation of the actuator in response to a signal received from the force sensor.

36. (Original) The apparatus of claim 35 wherein the feedback device includes a microprocessor.

37. (Original) The apparatus of claim 35 wherein the actuator is positioned to move the conditioning body laterally over the planarizing surface.

38. (Original) The apparatus of claim 35 wherein the actuator is positioned to rotate the conditioning body in a generally circular motion over the planarizing surface.

39. (Original) The apparatus of claim 35 wherein the planarizing medium includes a polishing pad.

40. (Original) The apparatus of claim 35, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the drag force.

41. (Original) The apparatus of claim 38 wherein the sensor includes a force sensor.

42. (Canceled)

43. (Canceled)

44. (Previously Amended) The apparatus of claim 38 wherein the piston is sealably engaged with the cylinder and the sensor includes a pressure gauge positioned within the gap to detect a change in pressure in the gap when one of the piston and the cylinder moves relative to the other.

45. (Previously Amended) The apparatus of claim 38, further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

46. (Previously Amended) A method for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

moving at least one of the planarizing medium and a conditioning body relative to the other of the planarizing medium and the conditioning body while the conditioning body is engaged with a planarizing surface of the planarizing medium, wherein the conditioning body is coupled to a support member for supporting the conditioning body relative to the planarizing medium, the support member including a generally upwardly extending portion coupled to the conditioning body and a generally laterally extending portion pivotably coupled to the upwardly extending portion; and

monitoring the conditioning body to detect a force of the planarizing medium on the conditioning body, wherein monitoring the conditioning body includes measuring a force transmitted to the support member by the conditioning body by detecting a force between the upwardly extending portion and the laterally extending portion with a force sensor.

47. (Original) The method of claim 46 wherein monitoring the conditioning body includes detecting a frictional force on the conditioning body in a plane generally parallel to a plane of the planarizing surface.

48. (Canceled)

49. (Canceled)

50. (Canceled)

51. (Canceled)

52. (Canceled)

53. (Previously Amended) The method of claim 46 wherein the support member includes a piston slidably received in a cylinder and monitoring the conditioning body includes detecting a movement of one of the piston and the cylinder relative to the other of the piston and the cylinder.

54. (Original) The method of claim 53, further comprising biasing one of the piston and the cylinder toward or away from the other of the piston and the cylinder.

55. (Previously Amended) The method of claim 46 wherein the support member includes a piston slidably and sealably received in a cylinder to form a sealed space between an end of the cylinder and an end of the piston, further wherein monitoring the conditioning body includes detecting a pressure within the sealed space.

56. (Canceled)

57. (Original) The method of claim 46, further comprising removing material from the planarizing medium while at least one of the conditioning body and the planarizing medium moves relative to the other of the conditioning body and the planarizing medium.

58. (Original) The method of claim 46, further comprising adjusting a force applied to the conditioning body approximately normal to the planarizing surface in response to detecting a force of the planarizing medium on the conditioning body.

59. (Original) The method of claim 46 wherein moving at least one of the planarizing medium and the conditioning body includes rotating the planarizing medium at a variable rate as the conditioning body moves across the planarizing medium to maintain a relative velocity between the planarizing medium and the conditioning body at an approximately constant value.

60. (Previously Amended) A method for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, the method comprising:

coupling a sensor to a conditioning body, wherein the conditioning body is coupled to a support member for supporting the conditioning body relative to the planarizing medium, and the support member includes a piston slidably received in a cylinder;

engaging the conditioning body with the planarizing medium and moving at least one of the conditioning body and the planarizing medium relative to the other of the conditioning body and the planarizing medium while the conditioning body engages the planarizing medium; and

monitoring the conditioning body to detect a frictional force between the conditioning body and the planarizing medium, wherein monitoring the conditioning body includes measuring a force transmitted to the support member by the conditioning body by detecting a movement of one of the piston and the cylinder relative to the other of the piston and the cylinder.

61. (Canceled)

62. (Canceled)

63. (Canceled)

64. (Canceled)

65. 40 (Previously Amended) The method of claim 60 39 wherein the support member includes a piston slidably and sealably received in a cylinder to form a sealed space between an end of the cylinder and an end of the piston, further wherein monitoring the conditioning body includes detecting a pressure within the sealed space.

66. (Canceled)

67. (Canceled)

68. (Canceled)

69. (Canceled)

70. (Canceled)

71. (Canceled)

72. (Canceled)

73. (Canceled)

74. (Canceled)

75. (Canceled)

76. (Canceled)

77. (Canceled)

78. 41 (Previously Amended) A method for conditioning a planarizing medium used for planarizing a semiconductor substrate, the method comprising:

engaging a conditioning body with the planarizing medium, wherein the conditioning body is coupled to a support member for supporting the conditioning body relative to the planarizing medium, and further wherein the support member includes a generally upwardly extending portion coupled to the conditioning body and a generally laterally extending portion pivotably coupled to the upwardly extending portion;

moving at least one of the conditioning body and the planarizing medium relative to the other of the conditioning body and the planarizing medium to remove material from the planarizing medium; and

maintaining an approximately constant frictional force between the conditioning body and the planarizing medium by adjusting a relative velocity between the conditioning body and the planarizing medium, wherein maintaining an approximately constant frictional force includes selecting a target frictional force, detecting a force between the upwardly extending portion and the laterally extending portion coupled to the conditioning body, and adjusting the relative velocity until the force is approximately equal to the target frictional force, and further wherein measuring a force transmitted to the support member includes detecting a force between the upwardly extending portion and the laterally extending portion with a force sensor.

79. (Canceled)

80. (Canceled)

81. (Canceled)

82. (Previously Amended) The method of claim 78 wherein the support member includes a generally upwardly extending portion coupled to the conditioning body and a generally laterally extending portion pivotably coupled to the upwardly extending portion, further wherein detecting the force includes detecting a force between the upwardly extending portion and the laterally extending portion with a force sensor.

83. (Canceled)

84. (Previously Amended) The method of claim 78 wherein the support member includes a piston slidably received in a cylinder and detecting the force includes detecting a movement of one of the piston and the cylinder relative to the other of the piston and the cylinder.

~~85~~ 44. (Original) An apparatus for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

a conditioning body having a conditioning surface configured to engage a planarizing surface of the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium to condition the planarizing surface;

a sensor coupled to the conditioning body to detect a frictional force in a plane of the planarizing surface, the frictional force being imparted to the conditioning body by the planarizing medium when the one of the conditioning body and the planarizing medium is moved relative to the other of the conditioning body and the planarizing medium;

a piston; and

a cylinder having an open end and a closed end, the cylinder sealably and slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the frictional force on the conditioning body, the piston and the cylinder defining a sealed gap between an end of the piston and the closed end of the cylinder, the sensor being positioned within the gap for measuring a change in pressure within the gap as the piston moves relative to the cylinder.

~~86~~ 45. (Original) The apparatus of claim ~~85~~ 44 wherein the planarizing medium includes a polishing pad.

~~87~~ 46. (Original) The apparatus of claim ~~85~~ 44 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

~~88~~ 47. (Original) The apparatus of claim ~~85~~ 44 wherein the conditioning body includes abrasive elements for abrading the planarizing surface of the planarizing medium.

89. 48 (Original) The apparatus of claim 88, 44 further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the frictional force.

90. 49 (Original) The apparatus of claim 88 44 wherein the sensor includes a force sensor.

91. 50 (Original) The apparatus of claim 88, 44 further comprising an actuator coupled to the conditioning body for controlling at least one of a position of the conditioning body and an approximately normal force between the conditioning body and the planarizing medium, the actuator being coupled to the sensor to receive signals from the sensor and adjust the one of the position and the approximately normal force in response to the signal.

92. 51 (Original) The apparatus of claim 88 44 wherein the piston has a generally circular cross-sectional shape and the cylinder has an aperture with a generally circular cross-sectional shape for receiving the piston.

93. 52 (Original) The apparatus of claim 88 44 wherein the piston has a generally rectangular cross-sectional shape and the cylinder has an aperture with a generally rectangular cross-sectional shape for receiving the piston.

94. 53 (Original) The apparatus of claim 88 44 wherein the piston is sealably engaged with the cylinder.

95. 54 (Original) The apparatus of claim 85, 44 further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

96. 55 (Original) An apparatus for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

a conditioning body having a conditioning surface configured to engage a planarizing surface of the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium to condition the planarizing surface;

a sensor coupled to the conditioning body to detect a frictional force in a plane of the planarizing surface, the frictional force being imparted to the conditioning body by the planarizing medium when the one of the conditioning body and the planarizing medium is moved relative to the other of the conditioning body and the planarizing medium;

a piston; and

a cylinder having an open end and a closed end, the cylinder sealably and slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the frictional force on the conditioning body, wherein the piston has a generally circular cross-sectional shape and the cylinder has an aperture with a generally circular cross-sectional shape for receiving the piston, and further wherein the piston and the cylinder define a sealed gap between an end of the piston and the closed end of the cylinder, the sensor being positioned within the gap for measuring a change in pressure within the gap as the piston moves relative to the cylinder.

97. 56 (Original) The apparatus of claim 96 55 wherein the planarizing medium includes a polishing pad.

98. 57 (Original) The apparatus of claim 96 55 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

99. 58 (Original) The apparatus of claim 98 55 wherein the conditioning body includes abrasive elements for abrading the planarizing surface of the planarizing medium.

100. 59 (Original) The apparatus of claim 96 55, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the frictional force.

101. 60 (Original) The apparatus of claim 96 55 wherein the sensor includes a force sensor.

102. 61 (Original) The apparatus of claim 96 55, further comprising an actuator coupled to the conditioning body for controlling at least one of a position of the conditioning body and an approximately normal force between the conditioning body and the planarizing medium, the actuator being coupled to the sensor to receive signals from the sensor and adjust the one of the position and the approximately normal force in response to the signal.

103. 62 (Original) The apparatus of claim 96 55 wherein the piston is sealably engaged with the cylinder.

104. 63 (Original) The apparatus of claim 96 55, further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

105. (Original) An apparatus for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

a conditioning body having a conditioning surface configured to engage a planarizing surface of the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium to condition the planarizing surface;

a sensor coupled to the conditioning body to detect a frictional force in a plane of the planarizing surface, the frictional force being imparted to the conditioning body by the planarizing medium when the one of the conditioning body and the planarizing medium is moved relative to the other of the conditioning body and the planarizing medium;

a piston; and

a cylinder having an open end and a closed end, the cylinder sealably and slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the frictional force on the conditioning body, the piston and the cylinder defining a sealed gap between an end of the piston and the closed end of the cylinder, wherein the piston has a generally rectangular cross-sectional shape and the cylinder has an aperture with a generally rectangular cross-sectional shape for receiving the piston, and further wherein the sensor being positioned within the gap for measuring a change in pressure within the gap as the piston moves relative to the cylinder.

106. (Original) The apparatus of claim 105 wherein the planarizing medium includes a polishing pad.

107. (Original) The apparatus of claim 105 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

108. (Original) The apparatus of claim 105 wherein the conditioning body includes abrasive elements for abrading the planarizing surface of the planarizing medium.

109. (Original) The apparatus of claim 105, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the frictional force.

110. (Original) The apparatus of claim 105 wherein the sensor includes a force sensor.

111. (Original) The apparatus of claim 105, further comprising an actuator coupled to the conditioning body for controlling at least one of a position of the conditioning body and an approximately normal force between the conditioning body and the planarizing medium, the actuator being coupled to the sensor to receive signals from the sensor and adjust the one of the position and the approximately normal force in response to the signal.

112. (Original) The apparatus of claim 105 wherein the piston is sealably engaged with the cylinder.

113. (Original) The apparatus of claim 105, further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

114. (Original) An apparatus for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

a conditioning body having a conditioning surface configured to engage a planarizing surface of the planarizing medium, at least one of the conditioning body and the

planarizing medium being movable relative to the other of the conditioning body and the planarizing medium to condition the planarizing surface;

a sensor coupled to the conditioning body to detect a frictional force in a plane of the planarizing surface, the frictional force being imparted to the conditioning body by the planarizing medium when the one of the conditioning body and the planarizing medium is moved relative to the other of the conditioning body and the planarizing medium;

a piston; and

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the frictional force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and the closed end of the cylinder, the sensor including a gauge positioned to measure movement of the one of the piston and the cylinder relative to the other of the piston and the cylinder.

74 73
118. (Original) The apparatus of claim 114 wherein the planarizing medium includes a polishing pad.

75 73
116. (Original) The apparatus of claim 114 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

74 73
117. (Original) The apparatus of claim 114 wherein the conditioning body includes abrasive elements for abrading the planarizing surface of the planarizing medium.

77 73
118. (Original) The apparatus of claim 114, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between

the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the frictional force.

118. (Original) The apparatus of claim 114 wherein the sensor includes a force sensor.

119. (Original) The apparatus of claim 114, further comprising an actuator coupled to the conditioning body for controlling at least one of a position of the conditioning body and an approximately normal force between the conditioning body and the planarizing medium, the actuator being coupled to the sensor to receive signals from the sensor and adjust the one of the position and the approximately normal force in response to the signal.

120. (Original) The apparatus of claim 114 wherein the piston is sealably engaged with the cylinder.

121. (Original) The apparatus of claim 114, further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

122. (Original) The apparatus of claim 114 wherein the gauge includes a pointer on one of the piston and the cylinder and a scale on the other of the piston and the cylinder, the pointer being aligned with the scale and movable relative to the scale to indicate relative movement between the piston and the cylinder.

123. (Original) An apparatus for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

a conditioning body having a conditioning surface configured to engage a planarizing surface of the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium to condition the planarizing surface;

a sensor coupled to the conditioning body to detect a frictional force in a plane of the planarizing surface, the frictional force being imparted to the conditioning body by the planarizing medium when the one of the conditioning body and the planarizing medium is moved relative to the other of the conditioning body and the planarizing medium;

a piston; and

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the frictional force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and the closed end of the cylinder, wherein the piston is sealably engaged with the cylinder and further wherein the sensor includes a gauge positioned to measure movement of the one of the piston and the cylinder relative to the other of the piston and the cylinder.

125. (Original) The apparatus of claim 124 wherein the planarizing medium includes a polishing pad.

126. (Original) The apparatus of claim 124 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

127. (Original) The apparatus of claim 124 wherein the conditioning body includes abrasive elements for abrading the planarizing surface of the planarizing medium.

128. (Original) The apparatus of claim 124, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the frictional force.

129. (Original) The apparatus of claim 124 wherein the sensor includes a force sensor.

130. (Original) The apparatus of claim 124, further comprising an actuator coupled to the conditioning body for controlling at least one of a position of the conditioning body and an approximately normal force between the conditioning body and the planarizing medium, the actuator being coupled to the sensor to receive signals from the sensor and adjust the one of the position and the approximately normal force in response to the signal.

131. (Original) The apparatus of claim 124 wherein the piston has a generally circular cross-sectional shape and the cylinder has an aperture with a generally circular cross-sectional shape for receiving the piston.

132. (Original) The apparatus of claim 124 wherein the piston has a generally rectangular cross-sectional shape and the cylinder has an aperture with a generally rectangular cross-sectional shape for receiving the piston.

133. (Original) The apparatus of claim 124 wherein the piston is sealably engaged with the cylinder.

134. (Original) The apparatus of claim 124, further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

135. (Original) The apparatus of claim 124 wherein the gauge includes a pointer on one of the piston and the cylinder and a scale on the other of the piston and the cylinder, the pointer being aligned with the scale and movable relative to the scale to indicate relative movement between the piston and the cylinder.

136. (Original) An apparatus for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

a conditioning body having a conditioning surface configured to engage a planarizing surface of the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium to condition the planarizing surface;

a sensor coupled to the conditioning body to detect a frictional force in a plane of the planarizing surface, the frictional force being imparted to the conditioning body by the planarizing medium when the one of the conditioning body and the planarizing medium is moved relative to the other of the conditioning body and the planarizing medium;

a piston;

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the frictional force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and the closed end of the cylinder, the sensor including a gauge positioned to measure movement of the one of the piston and the cylinder relative to the other of the piston and the cylinder; and

a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

137. (Original) The apparatus of claim 136 wherein the planarizing medium includes a polishing pad.

138. (Original) The apparatus of claim 136 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

139. (Original) The apparatus of claim 136 wherein the conditioning body includes abrasive elements for abrading the planarizing surface of the planarizing medium.

140. (Original) The apparatus of claim 136, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the frictional force.

141. (Original) The apparatus of claim 136 wherein the sensor includes a force sensor.

142. (Original) The apparatus of claim 136, further comprising an actuator coupled to the conditioning body for controlling at least one of a position of the conditioning body and an approximately normal force between the conditioning body and the planarizing medium, the actuator being coupled to the sensor to receive signals from the sensor and adjust the one of the position and the approximately normal force in response to the signal.

143. (Original) The apparatus of claim 136 wherein the piston has a generally circular cross-sectional shape and the cylinder has an aperture with a generally circular cross-sectional shape for receiving the piston.

144. (Original) The apparatus of claim 136 wherein the piston has a generally rectangular cross-sectional shape and the cylinder has an aperture with a generally rectangular cross-sectional shape for receiving the piston.

145. (Original) The apparatus of claim 136 wherein the piston is sealably engaged with the cylinder.

146. (Original) The apparatus of claim 136 wherein the gauge includes a pointer on one of the piston and the cylinder and a scale on the other of the piston and the cylinder, the pointer being aligned with the scale and movable relative to the scale to indicate relative movement between the piston and the cylinder.

147. (Original) An apparatus for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

a conditioning body having a conditioning surface configured to engage a planarizing surface of the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium to condition the planarizing surface;

a sensor coupled to the conditioning body to detect a frictional force in a plane of the planarizing surface, the frictional force being imparted to the conditioning body by the planarizing medium when the one of the conditioning body and the planarizing medium is moved relative to the other of the conditioning body and the planarizing medium;

a piston; and

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the frictional force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and the closed end of the cylinder, the sensor including a gauge positioned to measure movement of the one of the piston and the cylinder relative to the other of the piston and the cylinder, wherein the gauge includes a pointer on one of the piston and the cylinder and a scale on the other of the piston and the cylinder, the pointer being aligned with the scale and movable relative to the scale to indicate relative movement between the piston and the cylinder.

148. (Original) The apparatus of claim 147 wherein the planarizing medium includes a polishing pad.

149. (Original) The apparatus of claim 147 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

150. (Original) The apparatus of claim 147 wherein the conditioning body includes abrasive elements for abrading the planarizing surface of the planarizing medium.

151. (Original) The apparatus of claim 147, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the frictional force.

152. (Original) The apparatus of claim 147 wherein the sensor includes a force sensor.

153. (Original) The apparatus of claim 147, further comprising an actuator coupled to the conditioning body for controlling at least one of a position of the conditioning body and an approximately normal force between the conditioning body and the planarizing medium, the actuator being coupled to the sensor to receive signals from the sensor and adjust the one of the position and the approximately normal force in response to the signal.

154. (Original) The apparatus of claim 147 wherein the piston has a generally circular cross-sectional shape and the cylinder has an aperture with a generally circular cross-sectional shape for receiving the piston.

155. (Original) The apparatus of claim 147 wherein the piston has a generally rectangular cross-sectional shape and the cylinder has an aperture with a generally rectangular cross-sectional shape for receiving the piston.

156. (Original) The apparatus of claim 147 wherein the piston is sealably engaged with the cylinder.

157. (Original) The apparatus of claim 147, further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

158. (Original) An apparatus for measuring forces during conditioning of a chemical-mechanical planarizing surface, comprising:

a planarizing medium having a planarizing surface for removing material from a microelectronic substrate, the planarizing surface defining a planarizing surface plane;

a conditioning body adjacent to the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium for conditioning the planarizing surface, the conditioning body and the planarizing medium generating a force in the planarizing surface plane when the one of the conditioning body and the planarizing medium moves relative to the other of the conditioning body and the planarizing medium;

a piston;

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and the closed end of the cylinder; and

a sensor operatively coupled to the conditioning body to detect the force; the sensor including a gauge positioned to measure movement of the piston relative to the cylinder.

159. (Original) The apparatus of claim 158 wherein the planarizing medium includes a polishing pad.

160. (Original) The apparatus of claim 158 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

161. (Original) The apparatus of claim 158 wherein the conditioning body is rotatable relative to the planarizing medium.

162. (Original) The apparatus of claim 158 wherein the conditioning body is translatable relative to the planarizing medium.

163. (Original) The apparatus of claim 158 wherein the planarizing medium is rotatable relative to the conditioning body.

164. (Original) The apparatus of claim 158 wherein the force is a drag force, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the drag force.

165. (Original) The apparatus of claim 158 wherein the sensor includes a force sensor.

166. (Original) The apparatus of claim 158 wherein the piston is sealably engaged with the cylinder.

126
167. (Original) The apparatus of claim 158, further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

127
168. (Original) The apparatus of claim 158, further comprising a feedback device coupled to the sensor and the conditioning body for changing at least one of the force between the conditioning body and the polishing pad and a position of the conditioning body relative to the polishing pad in response to a signal from the sensor.

128
169. (Original) An apparatus for measuring forces during conditioning of a chemical-mechanical planarizing surface, comprising:

a planarizing medium having a planarizing surface for removing material from a microelectronic substrate, the planarizing surface defining a planarizing surface plane;

a conditioning body adjacent to the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium for conditioning the planarizing surface, the conditioning body and the planarizing medium generating a force in the planarizing surface plane when the one of the conditioning body and the planarizing medium moves relative to the other of the conditioning body and the planarizing medium;

a piston;

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and the closed end of the cylinder, wherein the piston is sealably engaged with the cylinder; and

a sensor operatively coupled to the conditioning body to detect the force, the sensor including a gauge positioned to measure movement of the piston relative to the cylinder.

129
170. (Original) The apparatus of claim 169 wherein the planarizing medium includes a polishing pad.

171. (Original) The apparatus of claim 169 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

172. (Original) The apparatus of claim 169 wherein the conditioning body is rotatable relative to the planarizing medium.

173. (Original) The apparatus of claim 169 wherein the conditioning body is translatable relative to the planarizing medium.

174. (Original) The apparatus of claim 169 wherein the planarizing medium is rotatable relative to the conditioning body.

175. (Original) The apparatus of claim 169 wherein the force is a drag force, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the drag force.

176. (Original) The apparatus of claim 169 wherein the sensor includes a force sensor.

177. (Original) The apparatus of claim 169, further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

178. (Original) The apparatus of claim 169, further comprising a feedback device coupled to the sensor and the conditioning body for changing at least one of the force between the conditioning body and the polishing pad and a position of the conditioning body relative to the polishing pad in response to a signal from the sensor.

179. (Original) An apparatus for measuring forces during conditioning of a chemical-mechanical planarizing surface, comprising:

a planarizing medium having a planarizing surface for removing material from a microelectronic substrate, the planarizing surface defining a planarizing surface plane;

a conditioning body adjacent to the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium for conditioning the planarizing surface, the conditioning body and the planarizing medium generating a force in the planarizing surface plane when the one of the conditioning body and the planarizing medium moves relative to the other of the conditioning body and the planarizing medium;

a piston;

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and the closed end of the cylinder;

a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder; and

a sensor operatively coupled to the conditioning body to detect the force, the sensor including a gauge positioned to measure movement of the piston relative to the cylinder.

180. (Original) The apparatus of claim 179 wherein the planarizing medium includes a polishing pad.

140 138
181. (Original) The apparatus of claim 179 wherein the conditioning body has a conditioning surface generally parallel to the planarizing surface.

141 138
182. (Original) The apparatus of claim 179 wherein the conditioning body is rotatable relative to the planarizing medium.

142 138
183. (Original) The apparatus of claim 179 wherein the conditioning body is translatable relative to the planarizing medium.

143 138
184. (Original) The apparatus of claim 179 wherein the planarizing medium is rotatable relative to the conditioning body.

144 138
185. (Original) The apparatus of claim 179 wherein the force is a drag force, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the drag force.

145 138
186. (Original) The apparatus of claim 179 wherein the sensor includes a force sensor.

146 138
187. (Original) The apparatus of claim 179 wherein the piston is sealably engaged with the cylinder.

147 138
188. (Original) The apparatus of claim 179, further comprising a feedback device coupled to the sensor and the conditioning body for changing at least one of the force

between the conditioning body and the polishing pad and a position of the conditioning body relative to the polishing pad in response to a signal from the sensor.

148

189. (Original) An apparatus for monitoring conditioning of a planarizing medium used for chemical-mechanical planarization of a microelectronic substrate, comprising:

a conditioning body having a conditioning surface configured to engage a planarizing surface of the planarizing medium, at least one of the conditioning body and the planarizing medium being movable relative to the other of the conditioning body and the planarizing medium to condition the planarizing surface, the conditioning body generating a drag force generally parallel to the planarizing surface;

a piston;

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and the closed end of the cylinder, wherein the piston is sealably engaged with the cylinder;

an actuator coupled to the conditioning body with a support assembly to control at least one of a generally normal force between the conditioning body and the planarizing medium and a position of the conditioning body relative to the planarizing medium;

a sensor coupled to the support assembly to detect the drag force, the sensor including a pressure gauge positioned within the gap to detect a change in pressure in the gap when one of the piston and the cylinder moves relative to the other, the sensor is positioned to detect relative motion between the piston and the cylinder; and

a feedback device coupled to the actuator to control activation of the actuator in response to a signal received from the force sensor.

149 148

190. (Original) The apparatus of claim 189 wherein the feedback device includes a microprocessor.

191. (Original) The apparatus of claim 189 wherein the actuator is positioned to move the conditioning body laterally over the planarizing surface.

192. (Original) The apparatus of claim 189 wherein the actuator is positioned to rotate the conditioning body in a generally circular motion over the planarizing surface.

193. (Original) The apparatus of claim 189 wherein the planarizing medium includes a polishing pad.

194. (Original) The apparatus of claim 189, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the drag force.

195. (Original) The apparatus of claim 189 wherein the sensor includes a force sensor.

196. (Original) The apparatus of claim 189, further comprising a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

197. (Original) An apparatus for monitoring conditioning of a planarizing medium used for chemical-mechanical planarization of a microelectronic substrate, comprising:

a conditioning body having a conditioning surface configured to engage a planarizing surface of the planarizing medium, at least one of the conditioning body and the

planarizing medium being movable relative to the other of the conditioning body and the planarizing medium to condition the planarizing surface, the conditioning body generating a drag force generally parallel to the planarizing surface;

a piston;

a cylinder having an open end and a closed end, the cylinder slidably receiving the piston, at least one of the piston and the cylinder being coupled to the conditioning body to slide relative to the other of the piston and the cylinder under the influence of the force on the conditioning body, the piston and the cylinder defining a gap between an end of the piston and the closed end of the cylinder,

an actuator coupled to the conditioning body with a support assembly to control at least one of a generally normal force between the conditioning body and the planarizing medium and a position of the conditioning body relative to the planarizing medium;

a sensor coupled to the support assembly to detect the drag force, the sensor being positioned to detect relative motion between the piston and the cylinder;

a feedback device coupled to the actuator to control activation of the actuator in response to a signal received from the force sensor; and

a biasing member coupled to the cylinder and the piston to bias the piston toward or away from the cylinder.

198. (Original) The apparatus of claim 197 wherein the feedback device includes a microprocessor.

199. (Original) The apparatus of claim 197 wherein the actuator is positioned to move the conditioning body laterally over the planarizing surface.

200. (Original) The apparatus of claim 197 wherein the actuator is positioned to rotate the conditioning body in a generally circular motion over the planarizing surface.

160 154
201. (Original) The apparatus of claim 197 wherein the planarizing medium includes a polishing pad.

161 154
202. (Original) The apparatus of claim 197, further comprising:

a first support member having first and second ends and being rotatably coupled toward the first end to the conditioning body, the second end of the first support member extending away from the conditioning body; and

a second support member coupled at a pivotable coupling to the first support member toward the second end of the first support member, the sensor being positioned between the first and second support members, the first support member being pivotable relative to the second support member to transmit a force to the sensor corresponding to the drag force.

162 154
203. (Original) The apparatus of claim 197 wherein the sensor includes a force sensor.

163 154
204. (Original) The apparatus of claim 197 wherein the piston is sealably engaged with the cylinder and the sensor includes a pressure gauge positioned within the gap to detect a change in pressure in the gap when one of the piston and the cylinder moves relative to the other.

164
205. (Original) A method for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

moving at least one of the planarizing medium and a conditioning body relative to the other of the planarizing medium and the conditioning body while the conditioning body is engaged with a planarizing surface of the planarizing medium, wherein the conditioning body is coupled to a support member for supporting the conditioning body relative to the planarizing medium, the support member including a piston slidably received in a cylinder; and

monitoring the conditioning body to detect a force of the planarizing medium on the conditioning body, wherein monitoring the conditioning body includes measuring a force

transmitted to the support member by the conditioning body by detecting a movement of one of the piston and the cylinder relative to the other of the piston and the cylinder.

165 164
206. (Original) The method of claim 205 wherein monitoring the conditioning body includes detecting a frictional force on the conditioning body in a plane generally parallel to a plane of the planarizing surface.

164 164
207. (Original) The method of claim 205 wherein the support member includes a generally upwardly extending portion coupled to the conditioning body and a generally laterally extending portion pivotably coupled to the upwardly extending portion, further wherein monitoring the conditioning body includes detecting a force between the upwardly extending portion and the laterally extending portion with a force sensor.

167 164
208. (Original) The method of claim 205, further comprising biasing one of the piston and the cylinder toward or away from the other of the piston and the cylinder.

168 164
209. (Original) The method of claim 205 wherein the support member includes a piston slidably and sealably received in a cylinder to form a sealed space between an end of the cylinder and an end of the piston, further wherein monitoring the conditioning body includes detecting a pressure within the sealed space.

169
210. (Original) A method for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

moving at least one of the planarizing medium and a conditioning body relative to the other of the planarizing medium and the conditioning body while the conditioning body is engaged with a planarizing surface of the planarizing medium, wherein the conditioning body is coupled to a support member for supporting the conditioning body relative to the planarizing medium, the support member including a piston slidably received in a cylinder;

biasing one of the piston and the cylinder toward or away from the other of the piston and the cylinder; and

monitoring the conditioning body to detect a force of the planarizing medium on the conditioning body, wherein monitoring the conditioning body includes measuring a force transmitted to the support member by the conditioning body by detecting a movement of one of the piston and the cylinder relative to the other of the piston and the cylinder.

170 169
211. (Original) The method of claim 210 wherein monitoring the conditioning body includes detecting a frictional force on the conditioning body in a plane generally parallel to a plane of the planarizing surface.

171 169
212. (Original) The method of claim 210 wherein the support member includes a generally upwardly extending portion coupled to the conditioning body and a generally laterally extending portion pivotably coupled to the upwardly extending portion, further wherein monitoring the conditioning body includes detecting a force between the upwardly extending portion and the laterally extending portion with a force sensor.

172 169
213. (Original) The method of claim 210 wherein the support member includes a piston slidably and sealably received in a cylinder to form a sealed space between an end of the cylinder and an end of the piston, further wherein monitoring the conditioning body includes detecting a pressure within the sealed space.

173
214. (Original) A method for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, comprising:

moving at least one of the planarizing medium and a conditioning body relative to the other of the planarizing medium and the conditioning body while the conditioning body is engaged with a planarizing surface of the planarizing medium, wherein the conditioning body is coupled to a support member for supporting the conditioning body relative to the planarizing medium, the support member including a piston slidably and sealably received in a cylinder to form a sealed space between an end of the cylinder and an end of the piston.; and

monitoring the conditioning body to detect a force of the planarizing medium on the conditioning body, wherein monitoring the conditioning body includes measuring a force

transmitted to the support member by the conditioning body by detecting a pressure within the sealed space.

215. (Original) The method of claim 214 wherein monitoring the conditioning body includes detecting a frictional force on the conditioning body in a plane generally parallel to a plane of the planarizing surface.

216. (Original) The method of claim 214 wherein the support member includes a generally upwardly extending portion coupled to the conditioning body and a generally laterally extending portion pivotably coupled to the upwardly extending portion, further wherein monitoring the conditioning body includes detecting a force between the upwardly extending portion and the laterally extending portion with a force sensor.

217. (Original) The method of claim 214 wherein the support member includes a piston slidably received in a cylinder and monitoring the conditioning body includes detecting a movement of one of the piston and the cylinder relative to the other of the piston and the cylinder.

218. (Original) The method of claim 214, further comprising biasing one of the piston and the cylinder toward or away from the other of the piston and the cylinder.

219. (Original) A method for monitoring conditioning of a planarizing medium used for planarizing a microelectronic substrate, the method comprising:

coupling a sensor to a conditioning body, wherein the conditioning body is coupled to a support member for supporting the conditioning body relative to the planarizing medium, and further wherein the support member includes a piston slidably and sealably received in a cylinder to form a sealed space between an end of the cylinder and an end of the piston;

engaging the conditioning body with the planarizing medium and moving at least one of the conditioning body and the planarizing medium relative to the other of the conditioning

body and the planarizing medium while the conditioning body engages the planarizing medium; and

monitoring the conditioning body to detect a frictional force between the conditioning body and the planarizing medium, wherein monitoring the conditioning body includes measuring a force transmitted to the support member by the conditioning body by detecting a pressure within the sealed space.

220. (Original) The method of claim 219 wherein monitoring the conditioning body further includes detecting a movement of one of the piston and the cylinder relative to the other of the piston and the cylinder.

221. (Original) A method for conditioning a planarizing medium used for planarizing a semiconductor substrate, the method comprising:

engaging a conditioning body with the planarizing medium, wherein the conditioning body is coupled to a support member for supporting the conditioning body relative to the planarizing medium, the support member including a piston slidably received in a cylinder;

moving at least one of the conditioning body and the planarizing medium relative to the other of the conditioning body and the planarizing medium to remove material from the planarizing medium; and

maintaining an approximately constant frictional force between the conditioning body and the planarizing medium by adjusting a relative velocity between the conditioning body and the planarizing medium, wherein maintaining an approximately constant frictional force includes selecting a target frictional force, detecting a force between the conditioning body and the planarizing medium and adjusting the relative velocity until the force is approximately equal to the target frictional force, wherein detecting the force includes measuring a force transmitted to the support member by the conditioning body by detecting a movement of one of the piston and the cylinder relative to the other of the piston and the cylinder.

222. (Original) The method of claim 221 wherein the support member includes a generally upwardly extending portion coupled to the conditioning body and a generally laterally extending portion pivotably coupled to the upwardly extending portion, further wherein detecting the force includes detecting a force between the upwardly extending portion and the laterally extending portion with a force sensor.